

SOME THOUGHTS ON THE ELEVATION OF THE MAIN RING

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These considerations have no doubt been expressed before, but possibly not in the same way. None of them is compelling, but taken together, they argue for a Main Ring elevation lower than 725, if any change is made, rather than higher.

(1) Foundation Strength - The lower glacial tills which underlie the site were compacted by the weight of the ice, so are impressively strong. The ring foundation should be low enough to ensure that it is based on these firmly compacted soils. (This may be the case at elevation 725). The relevance of this is a matter of tunnel space - the amount of allowance which must be made for ring settlement in the positioning and connection of the magnets.

(2) Weight of Overburden - There exists a ring elevation which is such that, when the earth shielding is piled back onto tunnel, the weight per unit length of tunnel has not been changed. If this is the chosen elevation, there will be no appreciable settlement, as significant settlement is due to compaction of soils extending below and to the sides for a considerable distance.

(3) Ground Water - No matter what elevation is chosen, footing drains will be needed to keep the tunnel dry. Waterproofing, even the fancy "protected membrane waterproofing", simply does not work if water pressure is allowed to build up. The permeability of the soils is so low that any system of footing drains will be able to take care of the flow of water without difficulty, independent of the depth or the elevation of the

water table. On the other hand, if the footings are at a level such that the natural water table is always above them, the expansion and contraction caused by wetting and drying will not cause motion of the magnet ring. The footing drains, of course, do not dry out the soils below their level.

(4) Plantings on Top of Shielding - If the annular hill is not too high, it will not be subject to the tendency to dry out to which such berms are prone. This will allow distinctive plantings which will make the ring a conspicuous thing, seen from above. I think of blue spruce, for example, as a tree which would tolerate some drying of its roots.

(5) Ring Access - A deep ring would be well served by hydraulic elevators sheltered by small extensions on several of the equipment houses. The 90° vertical bend where the service tunnel meets the elevator, coupled with a sweeping curve in the service tunnel itself, would be an excellent "maze" geometry, and the elevator mechanism would be well out of the high radiation field. This system would give a sheltered, all weather tunnel access in a natural way.